## DETAILED ACTION

### *Status of the Application*

**[1]** Claims 1 and 3-9 are pending in the application.

**[2]** Applicant's amendment to the claims, filed on 4/13/09, is acknowledged. This listing of the claims replaces all prior versions and listings of the claims.

**[3]** Receipt of a sequence listing in computer readable form (CRF), a paper copy thereof, a statement of their sameness, and a statement that no new matter has been added to the specification by the paper copy of the sequence CRF, all filed on 4/13/09, is acknowledged. The sequence listing incorporates the nucleic acid and amino acid sequences of *Bombyx mori* VP3 capsid protein as disclosed by Ikeda et al. (cited as reference AN in the IDS filed on 7/8/05) at p. 990, Figure 1.

**[4]** Receipt of an information disclosure statement, filed on 4/13/09, is acknowledged.

### *Information Disclosure Statement*

**[5]** The reference cited in the information disclosure statement filed on 4/13/09 has been considered by the examiner. A copy of Form PTO/SB/08 is attached to the instant Office action.

### *Examiner's Amendment to the Specification*

**[6]** An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Ryan B. Chirnomas 6/25/09.

**[7]** The application has been amended as follows:

**[8]** Enter the sequence listing paper copy filed on 4/13/09 into the specification.

**[9]** The original abstract filed on 7/8/05 is greater than 150 words and has been re-written as follows: ---It is intended to provide a protein complex and a production process whereby the protein complex can be efficiently produced without lowering its function. It is also intended to provide use of the protein complex in a biosensor, an immobilized enzyme and so on. A protein complex comprising a polyhedral protein having an insect virus encapsulated therein and a target protein having a restricted region of a capsid protein VP3 of cytoplasmic polyhedrosis virus, more specifically, a region which is either a region from the N-terminus to the 40th amino acid residue or a region from the 41st amino acid residue to the 79th amino acid residue as an embedding signal for polyhedron, and a process for producing the same. The polyhedral protein has an effect on improvement in the stability of the target protein, protection thereof or improvement in the preservation properties thereof, or a combination thereof.---

***Examiner's Amendment to the Claims***

**[10]** An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Ryan B. Chirnomas 6/25/09.

**[11]** Claims 1, 5, 6, and 9 have been amended as follows:

1. An isolated protein complex comprising:

a polyhedral protein of *Bombyx mori* strain H cytoplasmic polyhedrosis virus (CPV) having *Bombyx mori* strain H CPV encapsulated therein; and

a target protein directly fused to the C-terminus of a fragment of a capsid protein VP3 of *Bombyx mori* strain H CPV,

wherein said fragment consists of the 41st to 79th amino acid residues of SEQ ID NO: 2 and is embedded in the polyhedral protein, and

wherein said target protein is heterologous with respect to said fragment and is encapsulated by the polyhedral protein.

5. A process for producing an isolated protein complex, comprising the steps of:

infecting a cell with a vector that has been integrated with a nucleic acid encoding a fragment of a capsid protein VP3 of *Bombyx mori* strain H cytoplasmic polyhedrosis virus (CPV) directly fused to a nucleic acid encoding a target protein

together with a recombinant virus that has been integrated with a gene encoding a polyhedral protein of *Bombyx mori* strain H CPV, and

culturing the infected cell, whereby a protein complex comprising a polyhedral protein of *Bombyx mori* strain H CPV having *Bombyx mori* strain H CPV encapsulated therein and a target protein directly fused to the C-terminus of a fragment of a capsid protein VP3 of *Bombyx mori* strain H CPV is produced in the cell,

wherein the fragment of the produced protein complex consists of the 41st to 79th amino acid residues of SED ID NO: 2 and is embedded in the polyhedral protein, and

wherein said target protein is heterologous with respect to said fragment and is encapsulated by the polyhedral protein.

6. A biosensor comprising:

an isolated protein complex comprising:

a polyhedral protein of *Bombyx mori* strain H cytoplasmic polyhedrosis virus (CPV) having *Bombyx mori* strain H CPV encapsulated therein; and

a target protein directly fused to the C-terminus of a fragment of a capsid protein VP3 of *Bombyx mori* strain H CPV,

wherein said isolated protein complex is arranged in dots or lines on a substrate and immobilized thereon,

wherein the fragment consists of the 41st to 79th amino acid residues of SEQ ID NO: 2 and is embedded in the polyhedral protein, and

wherein said target protein is heterologous with respect to said fragment and is encapsulated by the polyhedral protein.

9. An isolated protein complex comprising:

a polyhedral protein of *Bombyx mori* strain H cytoplasmic polyhedrosis virus (CPV) having *Bombyx mori* strain H CPV encapsulated therein; and

a target protein directly fused to the C-terminus of a fragment of a capsid protein VP3 of *Bombyx mori* strain H CPV,

wherein said target protein is an enzyme, is heterologous with respect to said fragment, and is encapsulated by the polyhedral protein, and

wherein said fragment consists of the 41st to 79th amino acid residues of SEQ ID NO: 2 and is embedded in the polyhedral protein.

***Notice of Rejoinder***

**[12]** Claim 1 is directed to an allowable product. Pursuant to the procedures set forth in MPEP § 821.04(B), claim 5, directed to the process of making or using an allowable product, previously withdrawn from consideration as a result of a restriction requirement, are hereby rejoined and fully examined for patentability under 37 CFR 1.104.

Because a claimed invention previously withdrawn from consideration under 37 CFR 1.142 has been rejoined, the restriction requirement between groups I and II as set forth in the Office action mailed on 9/17/07 is hereby withdrawn. In view of the

withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

***Examiner's Reasons for Allowance***

**[13]** In view of the instant amendment to the claims and further in view of the examiner's amendment to the claims as set forth above, the rejections as set forth in the Office action mailed on 12/22/08 are withdrawn.

**[14]** The closest prior art of record is the reference of Ohta et al. (cited in the IDS filed on 7/8/05 as reference AF; English-language equivalent is US Patent Application Publication 2004/0059091, cited in the PTO-892 mailed on 12/20/07). The difference between the reference of Ohta et al. and the claimed invention is that there is no teaching or suggestion in the reference of Ohta et al. or the remaining prior art of record that would motivate one of ordinary skill in the art to directly fuse the target protein to the C-terminus of a fragment of *B. mori* strain H CPV VP3 protein consisting of residues 41-79 (out of 1057 residues). Moreover, there is no reasonable expectation of success that fusing a target protein directly to the C-terminus of a fragment of *B. mori* strain H

CPV VP3 protein consisting of residues 41-79 would result in a polyhedral protein with an embedded VP3 protein fragment fused to an encapsulated target protein.

**[15]** As such, claims 1 and 3-9, drawn to a protein complex and method for making such complex are allowable over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Steadman whose telephone number is 571-272-0942. The examiner can normally be reached on Mon to Fri, 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on 571-272-0811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David J. Steadman/
Primary Examiner, Art Unit 1656